

ASA

BULLETIN

JULY, 1930

NUMBER 51

	Page
State and National Aspects of the Safety Code Movement.....	3
Necessity for Safety Standardization—How Can This Be Brought About.....	7
British Association Issues New Standards..	14
Conference of International Standards Association.....	15
Casualty Companies Join Underwriting...	15
ASA Projects.....	16
Abbreviations for Scientific and Engineering Terms.....	16
ASA Standards Council Approves Committee on National Electrical Code.....	20
Abrasive Wheels Code New American Standard	21
To Submit New Draft Test Code for Domestic Refrigerators.....	22

PUBLISHED MONTHLY FOR THE SUSTAINING MEMBERS OF THE
AMERICAN STANDARDS ASSOCIATION, 29 WEST 39TH STREET, NEW YORK

ASA MEMBER-BODIES

AM. ELECTRIC RAILWAY ASSN.	LAUNDRYOWNERS NAT'L ASSN. OF
AM. GAS ASSN.	THE U. S. AND CANADA
AM. GEAR MFRS. ASSN.	MFRS. STANDARDIZATION SOC. OF
AM. HOME ECONOMICS ASSN.	THE VALVE AND FITTINGS IND.
AM. INSTITUTE OF ARCHITECTS	NAT'L ASSN. OF MUTUAL CAS. CO'S.
AM. INSTITUTE OF ELEC. ENGRS.	NAT'L AUTOMATIC SPRINKLER ASSN.
AM. INSTITUTE OF MINING & MET-	NAT'L BUR. OF CASUALTY AND
ALLURGICAL ENGRS.	SURETY UNDERWRITERS
AM. MINING CONGRESS	NAT'L COAL ASSN.
AM. RAILWAY ASSN.—ENG. DIV.	NAT'L ELECTRICAL MFRS. ASSN.
AM. SOC. OF CIVIL ENGRS.	NAT'L MACHINE TOOL BLDRS.' ASSN.
AM. SOC. OF MECHANICAL ENGRS.	NAT'L SAFETY COUNCIL
AM. SOC. FOR TESTING MATERIALS	THE PANAMA CANAL
ASSN. OF AM. STEEL MFRS.	SMALL TOOLS GROUP:
CAST IRON PIPE RESEARCH ASSN.	DRILL AND REAMER SOC.
COMMON BRICK MFRS. ASSN. OF AM.	MILLING CUTTER SOC.
ELECTRIC LIGHT AND POWER GROUP:	TAP AND DIE INSTITUTE
ASSN. OF EDISON ILLUM. CO'S.	SOC. OF AUTOMOTIVE ENGRS.
NAT'L ELECTRIC LIGHT ASSN.	TELEPHONE GROUP:
FIRE PROTECTION GROUP:	BELL TELEPHONE SYSTEM
ASSOCIATED FACTORY MUTUAL	U. S. INDEPENDENT TEL. ASSN.
FIRE INSURANCE CO'S.	U. S. DEPARTMENT OF AGRICULTURE
NAT'L BOARD OF FIRE UNDER-	U. S. DEPARTMENT OF COMMERCE
WRITERS	U. S. DEPARTMENT OF INTERIOR
NAT'L FIRE PROTECTION ASSN.	U. S. DEPARTMENT OF LABOR
UNDERWRITERS' LABORATORIES	U. S. NAVY DEPARTMENT
INTERNAT'L ACETYLENE ASSN.	U. S. WAR DEPARTMENT

OFFICERS

W. J. Serrill	<i>President</i>
Cloyd M. Chapman	<i>Vice-President</i>
P. G. Agnew	<i>Secretary</i>
F. J. Schlink	<i>Assistant-Secretary</i>

EDITORS

F. J. Schlink	Arthur Kallet
---------------	---------------

State and National Aspects of the Safety Code Movement¹

by

P. G. Agnew, *Secretary*
American Standards Association

National Safety Code Program Aids State Regulatory Bodies; Advantages of Regulatory over Legislative Methods Cited

At the convention of your Association in Toronto last year, Lewis A. DeBlois, Director of the Safety Engineering Division of the National Bureau of Casualty and Surety Underwriters, discussed the "Necessity for Safety Standardization." The discussion of Mr. DeBlois' paper and the increased interest in safety code development work manifested during the past year by several states which heretofore had not been active in this work seem to justify a further discussion of national codes. In this, particular attention will be paid to the relation of national codes to state regulatory work and to the desirability of the State Commissions taking a more active and responsible part in the development of the national codes.

In order to save as much time as possible for the discussion which is to follow, I will not enter into the details of the American Standards Association, under whose auspices the national codes are being developed, or of the functions of the technical committees in charge of the individual codes. I have prepared a statement on this point which, it is hoped, may appear in the proceedings as a part of this paper. It might not be amiss, however, to touch briefly upon the organization of a technical committee and its work of developing a safety code.

A joint technical committee is in charge of each national code. It is made up of representatives of interests broadly classified as follows:

- Manufacturers (Makers of equipment)
- Employers (Purchasers, owners, users of the equipment)
- Employees
- Governmental Bodies having regulatory power, or influence over the field in question
- Specialists at large, such as staff representatives of technical societies, consulting

¹ Presented before the Annual Convention of the Association of Governmental Officials in Industry, at Louisville, Ky., May 22, 1930.

experts with no exclusive business affiliation, and college professors
Insurance representatives.

This representation insures that all interests in any way concerned with the project have a voice in its development. It is the same group classification as that which is in general use by states that have been developing safety codes, and has proved satisfactory to them. Generally speaking, individuals on the committee do not serve as individuals but as representatives of national associations, so that the committee is truly national in scope, and the membership of the association, through its official organs, is kept constantly in touch with the development of the project.

It will be noted that state regulatory bodies, such as labor departments, are given a definite place in committee representation. This representation is individual, or through such organizations as the Association of Governmental Officials in Industry or the International Association of Industrial Accident Boards and Commissions. The policy has been definitely established that any state that so desires, regardless of any representation that it may have through either of the organizations mentioned, may have membership on technical committees. The A.G.O.I. now have representatives serving on about twenty technical committees, which indicates that it is the policy of this Association to cooperate very extensively in the development of national safety codes.

The technical committees elect their own chairmen and secretaries and proceed to develop a code that will cover the scope previously laid down. The committee is free to obtain and use any advice that it can get to enable it to complete its work, and in many cases organizes subcommittees composed of persons who are not members of the main technical committee. The final draft of the code is submitted to the entire membership of the technical committee for

approval. If approved it is sometimes printed and widely distributed for criticism, and sometimes it is submitted without further delay, through the sponsor body, to the American Standards Association for approval. The ASA takes formal action only when it is satisfied that all interests in any way affected by the code have had ample opportunity to participate in its development, and that the completed document represents a real national consensus.

Example of Safety Code Procedure

As an example of this standardization method of arriving at a national consensus, let us choose a specialized but relatively simple industrial problem—the protection of workmen in the use of grinding wheels.

The work of formulating a safety code on the subject was carried out by a joint committee made up of representatives of all interested groups: the manufacturers, through their national trade association; regulatory bodies having authority over safety matters in the industries, through their national associations; employing groups which are users of grinding wheels, through their trade associations; casualty insurance companies, through their two national organizations; the workmen whom the code is designed to protect, this representation being arranged through the U. S. Department of Labor; national engineering societies; technical bureaus of the federal government; and independent specialists.

In all, seventeen national organizations are represented on the joint committee, which has thirty members. After two years of painstaking work, unanimous agreement upon a complete code was reached. This was not accomplished, however, without encountering some serious difficulties and differences of opinion.

The code covers the general safety requirements to be met in the construction, care, and use of grinding wheels. It is recognized as the authoritative guide to the industry, and is being legally adopted by the various state commissions.

The procedure followed in connection with the development of the code has recently been followed in its revision. Revision was undertaken as a result of information presented to the ASA by an important national trade association, and extensive tests and experiments were made before the committee agreed to include in the revised code the results of these investigations. These methods have been perfected as a result of ten years' experience in the development of national safety codes.

A short time ago it was felt that it was time to take stock so as to determine to what extent the work was serving the various groups affected. This stocktaking showed definitely

that the national program had become well established; that much excellent work in the development of codes had been done; that some of the codes, such as the Safety Code for Elevators and Escalators, and the Safety Code for Abrasive Wheels, had practically reached the status of a "Bible" in their respective industries; but that much yet remained to be done in furthering the use of completed codes and speeding up the work on the codes in process of development.

A general strengthening of the safety code work was considered necessary, and in the main this is being concentrated in the work of two committees. These are the Committee on Promotion of the Use of Codes in Industry, and the Committee on Scope. In general, these two committees will be responsible for the planning, stimulation, and carrying out of methods for bringing codes into general use by making them part of the regular operation of industrial concerns. They will also consider the need for revision, the question of the development of new codes, and the correlation of codes, so that in their published form they may be more effective instruments than would otherwise be the case.

To assist in carrying out this program, a safety engineer was added to the staff of the ASA—a man schooled in safety work in industry, and with an extensive experience in the department of labor of one of the large industrial states.

I have gone into these details in order to emphasize the desire of the ASA to be of service, and to draw forth, either in the discussion or by personal suggestion, your ideas as to how this service may be most effectively rendered.

Regulation versus Legislation

Some of the states are not permitted by the laws under which they operate to administer safety codes in their accident prevention work. These, and other states which do so by preference, work under direct legislative acts. This situation is one which deserves careful study. It has a vital relation to the national safety code program. The experience of states cooperating in the national safety code work indicates several very definite advantages in the use of the regulatory as compared with the legislative method:

I

Accident prevention work is placed in the hands of a specialized body. It is only proper that those who are confronted daily with the problem of preventing accidents should be entrusted with the duty of preparing the complete plans and putting them into effect. In legislation, the ultimate decision is necessarily in the hands of a body whose members themselves cannot have an

adequate knowledge of the intricacies of the subject with which the legislation deals. Consequently, it not infrequently gets distorted in the larger game of partisan politics.

2

Participation of industry in the development of an accident prevention program is secured. Not only does industry welcome the opportunity to assist in the development of safety regulations, but through this contact it also becomes awakened to the general accident situation and is ready and willing to offer constructive suggestions for the working out of a comprehensive program. I believe that in practically every case where a state has entered upon an active safety code development program it has eventually instituted a general program covering all phases of accident prevention work.

3

Legislation must be enforced as written. Nowhere do the basic laws of the various states give executive departments the right to decide what sections of the laws shall be enforced, or against whom they shall be enforced.

Regulations, on the other hand, may be enforced in such a way as to meet specific conditions. For example, in the State of New York certain procedure in regard to variations has been established under which the Industrial Board, upon petition, may, if the facts so warrant, make a variation from a particular rule to meet a specific condition in the establishment of the petitioner, which will also apply to all establishments with the same specific conditions. This flexibility of procedure and enforcement secures a maximum compliance without hardship and promotes the good-will of industry toward the department responsible for safety work.

4

Regulations may be amended or repealed whenever conditions warrant. Experience gained through the enforcement of regulations frequently shows the necessity for changes. Regulations may be revised without difficulty; the same cannot, however, be said of legislation. Legislation is dependent on the whims of the legislature, and several years may pass before it is possible to obtain the amendments needed.

An example of the impracticability of including detailed specifications in legislation is found in certain provisions of the mining law of the state of Pennsylvania. The law in question specifies in some detail

how blasting shall proceed. It provides that the hole shall be filled, leaving no air voids. Research in the course of the last few years has shown it to be desirable to have a certain amount of air void, since this "eases off" the explosion, and the danger of falling rocks is thereby reduced. It also results in 2 per cent more salable coal. Here we have a case of a law prohibiting a practice which prevents accidents and is of considerable economic value. If the same condition existed in a safety code, it could be amended without delay, while several sessions of the legislature may pass before the law can be changed.

Value of National Codes

Assuming that it is true that the adoption of regulations by labor departments in accident prevention work is highly desirable, what advantages may be derived from the use of national safety codes as the basis of state regulations? Several very definite points emphasize such advantages to labor departments that have been engaged in the development of safety codes for some time, and even more, to departments whose budgets do not permit their retaining the staff necessary to carry on such work.

It has been pointed out that regulatory bodies have direct representation on technical committees, and that they are also represented through the Association of Governmental Officials in Industry and the International Association of Industrial Accident Boards and Commissions. As already stated, the former is now represented on about twenty technical committees, and the latter is represented on about thirty. That national safety codes will be prepared in a form acceptable to regulatory bodies; that they will admit of enforcement; and that they may be applied with the least possible friction is assured by such representation. In other words, the provisions of national safety codes are not so drastic that industry would protest their enforcement, nor are they so weak or general that the regulatory body would find it necessary to spend considerable time in redrafting their provisions to render them effective.

The careful selection of the members of the technical committees, particularly as to their experience, is one of the safeguards insuring the correctness of the codes. A very definite effort is made to secure individuals of the widest possible experience for service on the committees. Also, the best literature available is obtained for their use. This point is important particularly to regulatory bodies which, through limitation of funds, may be unable to employ adequate technically trained staffs to conduct the research and investigation necessary to the development of a correct code. The wide distribution of tentative

drafts for the securing of criticism, and their reference to regulatory bodies for public hearings, brings to the ASA a wealth of information that is incorporated in the code before the final draft is completed.

The national codes naturally are far from perfect. Like codes developed by individual states, they need amending from time to time in the light of new information, but at the time they are developed, the national codes represent the best in thought and practice.

Another advantage in using national codes lies in the fact that they may be adopted with a minimum of opposition. Any state starting a safety code program is bound to meet with a certain amount of opposition from uninformed local industries. Some of them have the mis-conceived notion that the Department of Labor through the enforcement of the code will operate in such a manner as to cause the industries endless embarrassment and hardship. The organization of the technical committees and the influence of national trade associations through their membership on technical committees tend to minimize the possibility of such misunderstanding in regard to individual codes. Most industries that will take the trouble to be represented at public hearings and present their constructive criticism are interested enough in their own self-advancement to be members of national trade associations, and through such associations they receive information concerning the codes which the associations have assisted in developing.

National Codes Insure Uniformity

The industries have learned that through the cooperative effort of the various groups concerned they may establish national standards that will benefit all the groups affected. This viewpoint, which is becoming more widespread every day, tends largely to remove objections to the adoption of national codes by regulatory bodies.

The adoption of safety codes by the regulatory bodies does not end the service which the ASA is able to render. A definite policy has been established which will enable the ASA to ensure uniformity in interpretation and adaptation of specific requirements of the codes. In some cases, the technical committees are held intact for the purpose of making periodic revisions. In other cases, the main committee is discharged, and a committee on interpretation is appointed which may be called upon for information concerning the interpretation of specific requirements and practical methods of applying the provisions to specific conditions. This service has not yet been developed to the fullest extent of its possibilities, and such service must be expanded if for no other reason than to obtain

the uniformity intended in the establishment of national codes. The use of this service can be of great advantage to labor departments. The administrative knowledge and experience of the various departments using the codes may thus be pooled, and the ASA will become the clearing-house for information on this point.

One of the greatest factors in the accident prevention movement today is the insurance business. Personally, I admire the efforts of these organizations. Years of contact with executives of companies engaged in this work have led me to the conclusion that they not only consider it good business but that they are genuinely interested in it as a service to humanity. Every labor department in its enforcement is bound to come in contact with the representatives of insurance companies. Hence the field work of the department using the national codes as a basis for state regulations is greatly simplified through the policy that has been established by the stock and mutual companies of bringing their schedules into conformity with the national safety codes. This means that the labor departments will obtain considerable assistance, both direct and indirect, from the inspection service of the insurance companies in obtaining compliance with the state regulations.

State Cooperation Urged

If time permitted, other advantages in the use of national codes could be presented, but before closing I want to discuss with you another question, namely, the desirability of a more extensive and intimate cooperation of the states in the development of national codes.

In discussing the organization of a technical committee, I mentioned the established policy that regulatory bodies can secure membership on technical committees. The fact is, however, that less than a dozen states have borne the burden of maintaining the labor department point of view in the development of national codes. The representatives of these states have served with fidelity, and I am glad to have this opportunity of publicly thanking them on the part of the ASA for the great service they have rendered in the development of the safety codes that are already recognized as American Standards. I am sure that these gentlemen will agree that in rendering this service they have received a fund of information that has been of great value to them. I am also sure that they will agree that the national codes would be stronger than they are if many more of the states would take an active part in their development.

It is realized that inasmuch as the headquarters of the ASA are located in New York, with the result that most of its meetings are held in that city, it is difficult and very costly for many of you to attend the committee meetings. The

ASA is so desirous of securing your advice and help that it will welcome your service on the committee by correspondence if you find you cannot attend the meetings in person.

The representatives of your Association serving on code committees will welcome your interest in their work. At present they serve as individuals, and their vote on approval of final drafts of codes represents their individual opinion, and not that of this Association. Your representatives have many times expressed the wish that they could in some way more truly reflect the views of the Association in their work on these committees. May I therefore suggest, in the absence of any definite procedure for instructing your representatives how to vote on

the questions coming before them, that you indicate to your representatives the fact that your state is interested in the code under consideration, and that you would be glad to be kept informed of the progress of the work.

It is abundantly evident that there is much to be gained in the movement for the prevention of industrial accidents by a far more intimate and active participation of the states in the national safety code program, not merely in the use of the codes in state work, but in directing policies and in the formulation of individual codes. The benefits of such cooperation will accrue to the state officials, to the industrialists, to the insurance companies and technologists, but most of all to the workman himself.

Necessity for Safety Standardization— How Can This Be Brought About?¹

by

Lewis DeBlois, *Director*
Safety Engineering Division, National Bureau
of Casualty and Surety Underwriters

Unnecessary Variations in State Safety Regulations Obstruct Progress of Safety Work

I assume that it is not necessary to convince you of the importance of basic safety standards by telling you that they are as essential to those who desire industrial accident prevention as are text books to the school-teacher, law-books to the lawyer, or military regulations to the soldier. They are the crystallization of experience—the consensus on what is indispensable for the protection of human life—the only worthwhile by-product of accidental injury. If we did not collect such knowledge and apply it intelligently to the prevention of accidents, we would be as irresponsible as children and little better than savages. Such information is virtually priceless, for it has been bought and paid for with blood and suffering and human life itself. Whether it is to be enacted into law, adopted as regulations, or merely embodied in a code for general use is relatively immaterial so long as it is written down and made available to those who need it.

We have in the United States two national

¹ Presented before the Sixteenth Annual Convention of the Association of Governmental Officials in Industry, Toronto, Ontario, June 5, 1929.

bodies concerned in the making of industrial safety standards: the American Standards Association, the structure and methods of which I need not describe, and the National Council on Compensation Insurance, a semi-governmentally controlled body representing the stock, mutual and state fund casualty insurance interests. Its code is the Industrial Compensation Rating Schedule. (The National Safety Council produces "Safe Practices Pamphlets," but they are not, strictly speaking, standards or codes.) Since, for the most part, insurance interests are represented on ASA committees by the same men who have to do with the making of the I.C.R.S. and efforts are exerted to keep these two sets of standards as nearly parallel as practicable, their safeguarding requirements are today quite similar. Such differences as exist are due in the main to inherent delays in making additions or amendments. Insofar as they cover their respective fields it can be said without gross error that we have only one body of safety standards for guidance which are national and authoritative.

They are not, however, and in the nature of things can never be, final or perfect.

State Regulations Vary

Aside from the safety rules or codes of industrial corporations and trade associations, the application of safety standards to manufacturing industry comes about either through the influence of the insurance carriers, with the I.C.R.S. as their instrument, or by the enforcement of state laws or regulations. While the effect of the insurance effort may vary, it is at least based on a single set of requirements. State enforcement, however, is quite another matter. Granted that it is not always possible to control the action of legislature and induce the framers of bills and legislative committees to follow accepted national standards it would seem as though something could be done to bring state departments of labor into line when formulating intended regulations or amending them.

To what extent are the laws, or regulations, or orders of the states at variance on fundamental requirements? I must confess that I do not know. I have never seen a comprehensive comparative statement of their requirements and doubt whether such a document is in existence. If you wish to understand why it does not exist, try to prepare one; because of the innumerable, detail divergencies and the differences in phraseology, you will find it an almost impossible task!

With a little time at my disposal, I have been able to study the requirements adopted by thirteen states for the protection of workers from contact with toothed gearing. I selected gears because they present one of the simplest and most obvious hazards with the least excuse for variations in protection. The thirteen states were merely those whose regulations were on my desk at the time. They are fairly well distributed; six of them are important industrially; eight of them have a reputation for active interest in industrial safety.

Taking up first the matter of coverage: two states make no attempt to define it. One state specifically demands protection for "all gears wherever located." Four states agree on "all gears exposed to contact"; one insists that it must be "hazardous contact" (when is contact with gears free from hazard?); and another that they must be "inrunning gears"—an expression reminiscent of "left-handed monkey wrenches" since the direction depends wholly on how one looks at the gears. Another state makes it "all power-driven gears exposed to contact" with disregard for the fact that all gears are moved by power of some sort. Four states, however, agree on the ASA and I.C.R.S. definition: all gears wherever located, except adjusting gears which do not normally revolve.

These differences are, however, relatively unimportant.

When we consider the general provisions for protection, we encounter an amazing tangle. There are three well-known methods of guarding the teeth and mesh-point: by encasing the gears in a close-fitting enclosure of solid metal or mesh, by surrounding the teeth with a ribbon of metal which has flanges projecting inward beyond the roots of the teeth, or by erecting a fence of mesh or a railing at some distance from the gears. For the sake of brevity, we shall refer to these methods as "casing," "ribbon," or "fence" and otherwise ignore the details of construction.

Four of the thirteen states require either casings or ribbons and two more are willing to have casings or ribbons or will permit fences under special conditions which do not coincide at all. This, however, is all the uniformity one finds; after that it is each state for itself! One will permit only ribbons; one demands "complete enclosure" without defining how; one demands nothing but "recommends complete boxing." One requires casings but will waive this requirement, if it is impracticable, in favor of ribbons. Another specifies casings or ribbons, but if both of these are impracticable will be satisfied with a fence. Still another specifies casings or fences but can be appeased with a ribbon. The last appears to be wholly indifferent and will accept casing or fence or ribbon without restrictions. And there are other differences. Some require fences to be extended to the height of seven feet above the floor; others to six feet; one permits a five-foot fence if it is two feet away from the gears. One state is willing to accept for small gears located on shaft-ends a revolving flange without any other enclosure.

Now we come to the revolving spoke hazard for which the ribbon-guard offers no protection since it is open centrally. As to the existence of the hazard: three states utterly ignore it; one state believes it exists in all gears having spokes or holes in the web; one affirms its existence when these spaces are two and one-half inches in size; three ignore it unless the gear is at least 18 inches in diameter; five states demand its protection "where it exists" without telling us where it does exist; seven states tell us how to guard it and are somewhat at variance; six states do not tell us how. Only one state mentions the use of a disc-guard fastened to the spokes which is permitted in the I.C.R.S. and ASA Power Transmission Safety Code and is common practice.

This is the story so far as I have been able to interpret these regulations. The title of the story might have been "The Thirteen Original States" for I suspect they all were trying to be a little original! There are nineteen more which

claim to have power transmission safety standards, and all of these, I suppose, have introduced their little originalities! But speaking seriously, is it possible that after fifteen years of the safety movement we have not yet learned how to protect the gearing which grinds the fingers off a colored mill-hand in Alabama in precisely the same way that it mutilates a Swede in Wisconsin, an Italian in New York City, or an Indian in Saskatchewan? I have seen in motion pictures Japanese workmen protected by first-class gear-guards on canning machines in far-away Sahgalien; friends of mine have told me of American machinery in shipment to the Soviet Republic which was better guarded than any they had been able to buy for use at home. Are you willing to admit that we are behind the Japanese and Russians in preventing accidents? Is originality and independence in the matter of state regulations more precious than human life?

Variations Complicate Safety Development

To a recent inquiry which we sent out for information on the guarding of machine tools, sixteen states did not reply, eleven states said they had no regulations, eight had general provisions only, and thirteen had specific requirements. Some of the replies were interesting: one state wrote that its inspectors followed "the codes of the different underwriters and the American Society of Mechanical Engineers," another that it used no codes but relied on the experience of its inspectors, a third that it needed neither codes nor inspectors because plant safety engineers were looking after conditions satisfactorily. Another state advised us that it used the regulations of an adjoining state, but I cannot imagine for what purpose since it has no inspectors and no power of enforcement. There is absence of uniformity, you see, all along the line.

What are the results? We have in the first place insurance inspectors and state inspectors working to different ends with consequent embarrassment to plant owners and depreciation of the inspectors' ability. To be forced to change a safety device which another inspector had just informed you would meet every requirement does not help one's disposition toward safety inspectors and the safety movement in general. From the insurance angle the situation is not a happy one. We are trying to keep the I.C.R.S. in harmony with the ASA codes but when we transmit ASA codes to our member companies we can only urge their use "where they do not conflict with local laws, regulations, and ordinances." This materially weakens their value to the companies. Think also of the situation confronting the large corporations which operate plants in many states; their safety departments have not only to bring about the use of their own

safety regulations but must see to it that all state regulations are complied with—which is no simple task, as I know from years of experience. It is easier to forget what the state wants and quietly damn its inspectors when they come around!

My deepest sympathy, however, goes out to those manufacturers of machinery who desire to make their products complete and safe. Have you wondered why we have made so little advance toward getting machines adequately guarded by their makers? Have you thought of the difficulties confronting them? Permit me to quote from a letter from a man who knows the situation of the machine-tool builders:

"I have no doubt whatever that if we can get the different states to agree on uniformity, we shall be able to get the machine-tool builders to conform to these uniform requirements and build guarding devices as essential parts of their machines. They simply cannot do it now in some cases.

"This of course would be particularly true in the matter of guarding the transmissions. . . .

"It is a very good time indeed for us to get the state authorities on to uniform guarding as much as possible. There is no difficulty whatever in getting the machine-tool industry to add the guards and to charge for them what they are worth, but the only trouble up to now has been that they couldn't tell what guards different states would need. Some want open-work, lacy effects in their built guards; others want an absolutely closed-up guard. Then there are varying heights. . . .

"You can count on us to cooperate fully. Get the regulations going, and we will do the rest in getting the manufacturers to realize the necessity of complying with them."

To obtain uniform protection of machinery by the makers would constitute a very real advancement. It would lift a material portion of the burden from the shoulders of the state inspectors, the insurance inspectors, and the safety engineers of industrial concerns. I know of one large corporation which has been forced to abandon its former policy of specifying on purchase requisitions the inclusion of safety devices because so many inadequate and sub-standard devices were supplied by the makers that it proved cheaper to build their own. Now they specify "no safety devices to be included. . ." I do not blame them, but it is a move in the wrong direction.

Another thing would be accomplished in time by maker-guarded machinery: we would have more and better guarded machinery in those

small industrial establishments which are reached by inspectors rarely, if at all. It is this class of establishment which is most backward in doing the things it ought to do and is the hardest to reach. Let the manufacturers guard the machinery for them and some of our difficulties will be overcome.

I have been surprised to find that Minnesota has a law (Section 4145, G.S. 1923) prohibiting the manufacture and sale of unguarded machinery. It reads:

"Manufacture and Sale of Unguarded Machinery Prohibited. Whenever practicable, the points of danger in any machine or mechanism shall be securely guarded by the maker, and the manufacture or sale of any machine or mechanism not so guarded is hereby prohibited."

I do not know how effective this law is but it is probably fortunate for the manufacturers of machinery that similar laws are not yet on the statute books of all our states. It will be time enough to discuss legal prohibition when we have cleared up the confusion that exists among our state safety requirements.

What shall we do about it?—for surely something must be done. Probably the most important field for work lies in the protection of mechanical power transmission. It would, I think, be a good place to begin. The ASA code on this subject is now due for revision under joint sponsorship of the I.A.I.A.B.C., A.S.M.E., and the National Bureau of Casualty and Surety Underwriters.

There are some state labor officials on the present committee but not enough to guarantee adoption of a completed code by all of the 32 states using power transmission safety codes. I cannot speak for the ASA but I see no reason why the revised code as prepared by the present committee before adoption should not be submitted for review and final endorsement to a larger reference body on which all states were represented. Such a referendum could be negotiated by mail and every effort used to adjust differences and causes for criticism. It could not be done, however, with the implied purpose of securing state adoption since that is not a function of the ASA.

With this first step done, some interested national body other than the ASA should prepare, on the basis of the adopted code, a set of model state regulations and, for the use of states having no power of enforcement, a model enabling act. It would then remain to secure their actual adoption by as many states as possible. This might be undertaken by the same interested body or by an association of organizations formed for the purpose. If these included trade associations concerned with the manu-

facture of machines and machinery, we would be killing two birds with one stone.

I am throwing out these ideas only for purposes of discussion—they may be entirely invalid. I am convinced, however, that the situation warrants your very careful attention and perhaps the appointment by your organization of a special committee to give it immediate consideration. Accidental industrial deaths are not decreasing. What we have done may have checked a sharper rise in the curve, but I believe that you will agree with me that a civilized people cannot contemplate with equanimity the killing of 24,000 persons a year. In the last decade accidents in the United States have abruptly terminated 830,000 lives, and of this slaughter industry is responsible for at least one-quarter. The time has certainly come for more concerted, positive, and constructive action.

Discussion

The discussion given below (which is quoted from the Bulletin of the United States Labor Statistics No. 508 entitled "Association of Governmental Officials in Industry of the United States and Canada, Proceedings of the Sixteenth Annual Convention, Toronto, Canada, June, 1929") took place following the presentation of Mr. DeBlois' paper.

MR. STEWART: May I ask Mr. DeBlois how he makes up his estimate that industry is responsible for one-quarter? That is decidedly low. Is it not responsible for about one-half?

MR. DEBLOIS: Of course we do not know. People are guessing, more or less, and the estimates of the number of industrial deaths in a year vary from 18,000 to about 27,000. The National Safety Council's figures for 1928, which are just out, place the number at 26,000. But it is nothing more than a guess. I do not know what we have. We have up to 96,000 total deaths a year, according to the census reports. Of course the census reports do not tell us how many are industrial deaths and how many are not. We do not know the number of street and home deaths. My own guess is one-quarter on streets and highways, one-quarter (with a question mark) in industry, and one-quarter in public places other than streets and homes, which will embrace the majority of travelers' deaths of which there are a large number. For further figures I refer you to the National Safety Council. They might be higher or they might be lower, no one knows.

MR. STEWART: You mentioned a standard guard. Do you think it is possible to put a standard guard on a machine used in different places?

MR. DEBLOIS: In my experience it is a hard matter to pick out a universal guard and say

that they have to put it on this machine, and then say to another man that he has to put on an altogether different guard. I think you can standardize as between States, but I do not think you can standardize as between machines. My quarrel is not with your point at all. There will have to be exceptions made; and there are exceptions made today according to the judgment of the inspectors, and so forth. You know that better than I do. My paper did not mention anything about the deviation that lies between the State code of regulations and the actual application of those regulations to industry. There is a field there for "give and take," and I think that is where the answer to your question lies. I can see no reason at all why with such an ordinary thing as tool guides, for example, we cannot have uniform regulations in our States.

A DELEGATE: We have taken this matter up with the manufacturers in Ontario, so that they may deal with the machine before it leaves the plant. We find it difficult after a machine leaves the manufacturer's plant, to ask the manufacturer why he did not put a guard on it. We have had a great deal of difficulty in getting manufacturers to put guards on. We find the results are better if the manufacturer makes something that completely covers the gears; that is easier than putting a fence around. You must have the gearing practically covered, so that a man cannot get inside. We find that we get better results when we ask the manufacturer to put the guards on.

MR. DEBLOIS: Guards made by the manufacturer are more likely to stay on the machines when the machines are sold. Are the manufacturers not more likely to stay with a machine when they make guards rather than when the guards are made off the premises?

MR. DAVIE: When a State inspector makes an inspection of a plant under the State inspection law, you will find that someone in authority in that department is the fairest to deal with. Of course I realize that you have something to sell in your particular branch of business.

I have always cooperated with the insurance inspector when we have had a problem of that kind, and I find it a good idea before issuing any orders to sit down and come to some understanding or agreement as to what is about right. It is largely a matter of getting along together—with the insurance inspector and the State inspector. I always feel that if we work along cooperative lines we will get better results.

I say quite frankly that this outburst of mine has not come out of any insurance experience or from any issue with the insurance companies. The whole thing has come out of meetings I have attended recently, called by various State commissioners of labor, and by talking

with men who have had to do with the enforcement of labor laws in the States and with people connected with American labor associations. There is, unquestionably, a value there to the insurance people; but what I am interested in at the moment is not the benefit to the insurance companies so much as in actually getting at what is one of our fundamental difficulties—that is, getting machinery guarded at the source. We may be sliding a little backwards, especially when we discover that the Pullman Car Company has ceased requiring guards to be provided.

A DELEGATE: Inspectors in the business a long time realize fully that at the present time our greatest hazards do not come from what we call machine accidents. Statistics of industrial accidents rather support that. The campaign that has been carried on by the members of this association in particular has been to the end that all modern machines should be equipped with safeguards at the source of supply. That is the proper place for the guards to be put on the machines; but when you get some old warhorse like myself you will have to take the safeguard off, because he cannot do the work; in fact, I have seen the whole equipment laid on a bench in the room because it was handicapping the men in their work.

From my point of view, if the insurance inspectors would sit down with fellows like us, we could do much more good than we have done in the past.

MR. AINSWORTH:¹ As a representative of a State that has taken a great interest in the national code program and from the viewpoint of one with considerable experience in the development of codes, may I say that the national codes have been of vital importance in the development of Pennsylvania's State codes.

The statement has been made that the national code program as outlined by Mr. DeBlois is no doubt of value to insurance companies in general which he represents. I am of the firm belief that the national codes are of far greater value to the various States than to the insurance companies. Codes are adopted and enforced by labor departments for one purpose only; namely, for the prevention of accidents. Just so long as there are a hundred different legal ways of guarding machines and other equipment, just so long will guards be of substandard design, and just so long will accidents continue to exist. Generally speaking there is only one correct way of guarding mechanical apparatus and that method should be followed by all regulatory bodies if the maximum results are to be obtained.

This system does not destroy States' rights or the privilege of working with local industries in the development of State codes. At least we

¹ Now safety engineer of the American Standards Association.

have found that to be the case in Pennsylvania. For many years we followed the general practice of most States, of calling together a State committee of experts, manufacturers, and employees, for the development of particular codes. Five or six years ago we entered actively into the national code work which meant that we had to dispense with the State committees. This departure was opposed for some time but I believe the opposition is gradually being overcome. We have not lost the contact with the industries of the State because of our system of public hearings. No code, whether State or National, is adopted in Pennsylvania until it has been presented to public hearings held at various points throughout the Commonwealth. This gives industry an opportunity to criticize the proposed regulations and offer to the department the suggestions it would have previously made at the committee meetings. The criticisms and suggestions received at the public hearings, if of an important nature, are referred to a committee for advice. This advice is then sent to the American Standards Association for the benefit of the sectional committee that drafted the national code in order that the code may be revised. In this way national uniformity is retained and the State's interests have been satisfied. This procedure has been tested out in Pennsylvania and can be strongly recommended to any State that has not taken up the use of national codes.

The trouble with the national code program as far as this association is concerned is the fact that the representatives of the association on the code committees work as individuals rather than as representatives. If more of the States would become interested in the movement and stand ready to assist the association's representative on the code committees, there would be less likelihood that the codes would need dressing up to make them meet individual State conditions. States should also take advantage of the rules of the American Standards Association which permit any State to have representation on a code committee regardless of whether the States are represented by this association or not.

We certainly hope that more States will take up the national code program. We are convinced that you will find it a vital part of your accident prevention programs.

MR. STEWART: I am very much interested in this discussion. It shows, contrary to what we sometimes feel, that we are making a little progress. Twenty-five years ago, I persuaded a Congressman to introduce a bill which provided that no machinery which was not guarded at the place of manufacture should be transported across State lines. A few months afterwards I received a letter from him stating that it seemed I was the only man in the United States

that had ever thought of, or was in favor of, such a thing; that the requirements of the different States were such that it was absolutely impossible; and that while he introduced the bill he did not feel justified in urging it.

It is only within the last fifteen years that we have even taken up this matter of trying to get uniformity. Dr. DeBlois' paper is the most encouraging thing I have heard for some time. I want to say that, as far as this organization is concerned, it has very often lacked a real object of existence—it has been shooting without any mark to shoot at, simply to hear the gun go off. I feel that it would be a very important step to take now; and I shall introduce a resolution that this organization take up as its objective, for a few years at least, the unification of standards with the object of getting the different States to agree on something whereby we can have machinery guarded at the place of manufacture. I think it is well worth our while to work for it, and I hope that this convention will adopt such a resolution.

MR. ROACH: I think I am largely responsible for getting Mr. DeBlois into this trouble. I represent this organization on the code correlating committee; I also represent the International Association of Industrial Accident Boards and Commissions on several code committees. For eight or nine years the members have put in valuable time on that work. A few months ago the committee had a meeting in New York—Mr. DeBlois was present and began to check up on how many jurisdictions had taken any notice of the work done by the American Standards Association. It was surprising to learn how few of the officials in our country knew anything about it, or had any conception of what an engineering code meant.

Now you cannot coordinate and make uniform groups of industrial safety rules unless you know something about them. I am firmly of the opinion that most of the delegates that are representing their States or Provinces in this convention today do not know much about these codes. I would not know anything about them myself unless I was on the code committee and made some study of the situation. I would say to all of you that you could do no better service for your people in the promotion of a larger measure of safety in industry than by writing to the secretary of this organization or to Mr. DeBlois and get copies of the fifteen or twenty completed safety codes, study them over, and see if they can be made part of a safety program in your respective jurisdictions.

Some of these codes have been drafted after months and years of study and effort on the part of trained engineering experts who have no personal bias whatever in doing the work. If you work on any of these standardization com-

mittees, and you have certain peculiar notions of your own, it is surprising how quickly somebody will knock a chip off your shoulder and set you down. In deciding mooted points it is a question of give and take, so that these codes probably represent the best engineering thought in safety circles.

I have visited factories in a number of different States. In some States belts and gears are not safely guarded. In some cases when a factory inspector discovers a break in a passageway floor it is corrected by throwing a board over it. That kind of practice obtains where codes are not adopted by labor departments.

While we have been meeting in conventions as an association for the past eighteen years (I think the first meeting I attended was held in Washington), this is the first time I have known this association to take up a definite project of this kind and shoot at a definite mark.

I hope that out of this discussion will arise a greater interest in the adoption of uniform codes, and that every one of the States and Provinces will profit by the work of the American Standards Association.

GENERAL SWEETSER: I also agree with what Mr. Stewart and Mr. Roach have said. I have served on these committees on codes, or have had a representative there, and I have also had the experience of my friend from Pennsylvania. In Massachusetts we manufacture a great deal of machinery of all kinds, and we are getting new machinery and new methods all the time.

In the consideration of these codes, you have to consider the law in each State. The law varies in the different States, and, as Mr. DeBlois has said, he has considered a standard for a standardized machine.

We insist upon a manufacturer in Massachusetts who manufactures a machine to be used in the State to furnish a guard for his particular machine.

We also have a blanket law in Massachusetts which provides that all dangerous machinery must be guarded, and we take that up with the manufacturer of machines even in New Jersey and New York when the machines are used in Massachusetts; we correspond with the manufacturer there and try to have every machine safeguarded. Massachusetts has adopted the national code, and uses it. Mr. Roach said he was surprised at the number of States that did not use it. These safety codes are on file and are always considered. Although it is not a code State, Massachusetts has a general law, as well as a blanket law, to cover the subject.

On the other hand, I agree with Mr. Stewart when he says that we ought to have a definite object. I think that is one of the reasons why we do not have a larger attendance and more

enthusiasm at our meetings—we have no definite object.

DOCTOR PATTON: I do not want to prolong this discussion, as the time is going fast. I think we are indebted to Mr. DeBlois for having given us a very interesting and instructive paper on the necessity for safety standardization in the United States, and how it can be brought about.

It may be, as Mr. Stewart said, that we have made some progress. I am not going to anticipate any resolution Mr. Stewart has in mind, although I confess that I had in mind the introduction of a suggestion or a resolution very much along the same lines.

Going back to ground which has been very well covered now, I would suggest that this convention appoint a sub-committee to advise ways and means of coordinating the safety codes. I know that coordination and uniformity have a bad sound these days; both of them are worked to death, but this intolerable confusion must come to an end, or safety work and all the talk about safety will largely evaporate into mere talk, without getting anywhere. This association would have more influence, if it would set up this particular object of trying to unify or coordinate all safety activities now going on in the United States and Canada. Not having anything to sell—because I am in no way related to that part of it—I may say that I think all these safety code activities should be coordinated, right across this continent.

MR. DAVIE: Let me say that I certainly am in sympathy with a uniform code. I shall study very carefully the resolution to be proposed by Mr. Stewart, as he is one of the men I have always looked up to in this particular work. I think that we all look at these things too much from our own point of view; and I don't want any one to leave with the idea that I am not in favor of a uniform code.

MR. SEILLER: I am surprised at the remarks of Mr. Roach when he says that in eighteen years there has been no definite program worked out. I agree with Commissioner Stewart in his remarks upon the question of safety standards. The message brought to us by Mr. DeBlois certainly deserves a great deal of consideration. I have in my library what one almost might call a national clearing house of labor laws, and I have found a great deal of difference in the codes, as Mr. DeBlois has pointed out, as well as in other labor legislation. It seems to me to be one big maze or conglomeration of things put together which do not work out in either theory or practice.

In the matter of uniformity, let me say that I am heartily in favor of it. We are working to that end in our State, aided by the cooperation of the safety departments and the insurance companies. In fact we are going to organize

through our universities and colleges; we have organized a group of instructors who are teaching political science and social science, and we are getting in shape to adopt a national safety code as promulgated by the American Engineering Standards Committee.

I can see no reason whatever, if it can at all be done, why there should not be uniformity of guards adopted by manufacturers of machinery. If it is practicable to do work on a machine here in Toronto, why should it not be practicable to do that work in old Kentucky?

Take as an illustration laundry machinery. I can see no difference between clothes being put into a laundry machine and taken out again in Toronto and in Kentucky.

Take the standardization of machinery, I think we can work that in on different standards, but on the construction of codes we have had much difficulty.

I think safety work can be developed successfully. As has been pointed out, I have found differences of opinion between inspectors, where they had no standards set. We have found that that in concrete cases defeats us many times, and handicaps us always.

I am not acquainted with the work of the American Engineering Standards Committee, but one of the first things I will do will be to make myself familiar with organizations of that kind. I have in my library a complete code, and we always urge the adoption of this code by the people of Kentucky. We think they are going to come across in time. You have some things in your code that we do not have in Kentucky—certain textile machinery in Massachusetts is not considered by the code in Kentucky. So there are differences and exceptions. I think there are about four different phases of industry covered there. We do not have anything like cocoa grinding.

If this organization did nothing more than to work out a safety standardization plan, it certainly would justify its existence.

Wooden Box Construction

The Freight Container Bureau of the American Railway Association has issued Bulletin 14, "A Guide to Good Construction of Nailed Wooden Boxes." This bulletin covers seven distinct types of nailed wooden boxes and includes illustrations and descriptions. The use of cement coated nails in box construction is recommended because they have greater holding power than plain or bright nails or barbed nails. Tables show the proper size and spacing of nails in various types of woods. Copies of this bulletin may be borrowed from ASA.

British Association Issues New Standards

Copies of three new British standards published by the British Engineering Standards Association have been received in the ASA office, and are available for loan or purchase through the ASA Information Service.

B.E.S.A. Specifications number 15, "Structural Steel for Bridges and General Building Construction," are a revision of the 1912 edition and contain the technical provisions necessary for the supply of structural steel (for bridges and building construction) made by the (a) open hearth process (acid or basic) or (b) the open hearth or the acid bessemer process. The specifications further define the kind and number of tests which shall be made, and the classes of material to be used, as well as the methods of making the tests.

The specifications for "Hard Drawn Copper Solid and Stranded Circular Conductors for Overhead Power Transmission Purposes" (No. 125-193) cover the class of material indicated by their title and defined in the first two sections of the specifications—Definitions, and Standards for Hard Drawn Copper. Other main clauses deal with standard resistances, weights and sizes, tolerances, mechanical properties, defects, joints, stranding, test samples, and methods of test. In addition, tables of the principle characteristics of conductors and the standards of resistance of the International Electrotechnical Commission for annealed copper are included.

The specifications entitled "Electric Motors and Generators for Mines" (No. 270-1930) apply to mine motors and generators rated at one horsepower, kilowatt, or kilovolt ampere per 1000 r.p.m., insulated with class A material as defined, and wound for voltages not exceeding 7000 volts, and to comply with the General Regulations as to the Use and Installation of Electricity made under the British Coal Mines Act of 1911. The specifications do not apply to machines of the turbine driven type, rotary converters, traction motors, nor to motors for coal cutters, drills, conveyors, and the like.

The specifications are divided into parts as follows: scope; construction; requirements for machines used in gaseous locations; construction requirements for machines used in locations where flame-proof enclosure is not required; electrical performance requirements; and appendices which contain a classification of insulating material, service conditions, temperature measurement, system voltages, and terminal markings. The last part of the specifications, "Notes on the Problem of Flame-Proof Enclosures," contains much information on the design features of such enclosures.

Casualty Companies Join Underwriting

An increase in the amount subscribed by the stock casualty companies to the underwriting of the American Standards Association has been authorized by the Executive Committee of the National Bureau of Casualty and Surety Underwriters. The companies will contribute \$6000 per year for the three-year period of the underwriting. A total of approximately \$150,000 per year has been made available to promote the work of the Association in the establishment of national industrial standards. The other organizations which have joined the underwriting are:

Aluminum Company of America
American Railway Association
American Telephone and Telegraph Company
Bethlehem Steel Company
Consolidated Gas Company
Detroit Edison Company
Ford Motor Company
General Electric Company
General Motors Corporation
Gulf Oil Company
Public Service Corporation of N. J.
Standard Oil Company of N. J.
U. S. Steel Corporation
Westinghouse Electric and Manufacturing Company
Youngstown Sheet and Tube Company

Valve and Fittings Society Joins ASA Membership

The Manufacturers Standardization Society of the Valve and Fittings Industry is the latest addition to the Member-Bodies of the American Standards Association. The Society, whose work since its organization in 1910 has been devoted almost exclusively to standardization, has been active in many ASA projects in its field. It is joint sponsor with The American Society of Mechanical Engineers and the Heating and Piping Contractors National Association for one of the most important ASA projects, that for Pipe Flanges and Fittings (B16).

The membership of the Society includes 41 companies manufacturing valves and fittings.

Howard Coonley, president of the Walworth Company, Boston, Mass., is chairman of the Society. Other officers are: Arthur M. Houser, Crane Company, Chicago, vice chairman; James S. Lattimore, Walworth Company, New York City, vice chairman and treasurer; Albert C. Taylor, 103 Park Ave., New York City, general secretary.

Conference of International Standards Association

The recent conference at Paris was attended by Mr. John Gaillard, ASA staff engineer. A report on the meeting by Mr. Gaillard will appear in an early issue of the ASA Bulletin. The following is a list of the more important subjects which were scheduled to be covered at the conference:

Paper sizes

Report on the results of the session of the sub-committee at The Hague.

Standardization of bill-heads and letter-heads

Punching

Transverse windows on envelopes
(Secretariat: Germany)

Test pressures for acceptance of new stationary steam boilers

(Secretariat: Czechoslovakia)

Standardization of orifices for the measurement of fluids

Exchange of views on:

Engineering drawings

(Secretariat: Switzerland)

Drills and tools

(Secretariat proposed: France)

Wrench openings

(Secretariat: Sweden)

Bolts

(Secretariat: Holland)

Sampling and analysis of coal

(Secretariat proposed: Poland)

Standardization of traffic signals

(Secretariat proposed: Holland)

Slide Rules Available

Some years ago the American Standards Association circulated a reprint describing a slide rule device made of cardboard, which permitted draftsmen and machine designers to obtain very quickly and accurately the leading dimensions of bolts, nuts, and associated facts such as tap drill diameter, cross sectional area, etc., without running the risk of error which accompanies the taking of such dimensions from a printed table in the customary way. This device, which so far as our information goes was first published and used in Switzerland to record basic dimensions of the Swiss national standard for bolts, nuts, washers, and thread characteristics for Whitworth threaded products, is now also being distributed by the Belgian firm, Messrs. Société Anonyme Gilsoco, of La Croyere, Belgium. The ASA will be glad to lend a specimen slide rule of this type for examination to any Sustaining-Member interested.

ASA PROJECTS

Abbreviations for Scientific and Engineering Terms

Draft of Proposed Standard Prepared by ASA Technical Committee Is Published for Review

A draft of the proposed American Tentative Standard for abbreviations for scientific and engineering terms (Z10i) is published in full on the following pages for the purpose of obtaining widespread comment and criticism. This draft was prepared by the ASA technical committee on scientific and engineering symbols and abbreviations under the chairmanship of J. Franklin Meyer of the United States Bureau of Standards. The sponsors for this project are the American Association for the Advancement of Science, American Institute of Electrical Engineers, American Society of Civil Engineers, Society for the Promotion of Engineering Education, and The American Society of Mechanical Engineers.

Preston S. Millar, of Electrical Testing Laboratories, New York City, who is secretary of the technical committee, states in submitting the draft:

"The report of our Sub-committee on Abbreviations, which was submitted about a year ago to the members of the Sectional Committee for action by letter ballot was accorded the approval of all but a few of the members.

"However, at the request of the American Institute of Electrical Engineers, one of the sponsors of this Sectional Committee, further action upon this report was deferred pending reconsideration by the Sub-committee on Abbreviations, in conjunction with a sub-committee of the Standards Committee of the A.I.E.E., of the abbreviations for the names of electrical units recommended some years ago by the International Electrotechnical Commission. The abbreviations in question have been fairly uniformly adopted throughout continental Europe and by certain authorities in Great Britain. They have not been used in this country, however, and for this reason were not included in the original report of the Sub-committee on Abbreviations.

"In view of the desirability of international cooperation in the matter of abbreviations for internationally standard-

ized units, the sub-committee has decided to include as alternative abbreviations those recommended by the I.E.C. The sub-committee has further decided, in the interests of simplicity and cooperation, to bring its recommended abbreviations more nearly in agreement with those of the I.E.C. by eliminating the hyphen from the abbreviations for certain compound names and the 'r' from such abbreviations as 'kwhr,' so that the only differences between the two lists are now in the matter of capital letters for the abbreviations for the names of electrical units derived from the names of scientists.

"The sub-committee also has made a few changes in wording in the fundamental rules for formation and use of abbreviations and has removed from its list some abbreviations which were not strictly of a scientific or engineering character."

Comment on or criticism of the draft may be addressed to the ASA office or directly to Preston S. Millar, Secretary of the technical committee, 80th Street and East End Avenue, New York City.

The draft follows:

Abbreviations for Scientific and Engineering Terms

Scope and Purpose

1. The Executive Committee of the Sectional Committee on Scientific and Engineering Symbols and Abbreviations has made the following distinction between symbols and abbreviations: a symbol is a letter or sign used in a formula as a substitute for any numerical value. A shortened expression for a name or a unit is an abbreviation and not a symbol.

Fundamental Rules for Formation and Use

2. Abbreviations should be used sparingly in text and with regard to the context and to the training of the reader. Terms denoting units of measure are abbreviated in the

text only when preceded by the amounts indicated in numerals; thus "several inches," "one inch," "12 in." In tabular matter, specifications, maps, drawings, and texts for special purposes, the use of abbreviations is governed by the desirability of conserving space.

3. Do not begin a sentence with a numeral followed by an abbreviation.

4. Avoid capitals in abbreviations except in words normally capitalized.

5. Hyphenated compound words usually call for hyphenated abbreviations; thus "ft.-lb." (for the sake of closer agreement with the recommendations of the International Electrotechnical Commission, exception to this rule is made in the cases of abbreviations for the names of certain electrical units, as "va." for volt-ampere).

6. With but a few exceptions of abbreviations in common usage, the singular only is used; thus "in." for "inches," not "ins."

7. Short words such as ton, day, and mile are generally spelled out.

8. Do not use abbreviations where the meaning will not be clear. In case of doubt, spell out.

9. The use of conventional signs for abbreviations in text is not recommended; thus per, not /; lb., not #; in., not ". Such signs are used sparingly in tables and similar places for conserving space.

10. The Sub-committee endorses the movement which was begun by the International Committee on Weights and Measures in omitting the period in abbreviations of metric units and further endorses the growing tendency toward the omission in abbreviations of other origin. In the interests of economy and the reduction of waste the Sub-committee recommends the elimination of the period except where such an omission results in an English word. Exceptions to this practice will be found in a few mathematical and chemical terms, such as sin, tan, log, Be, etc.

11. Do not space the letters of such abbreviations as A.S.M.E. (not A. S. M. E.).

12. The use in text of exponents for the abbreviations of square and cube and of the negative exponents for terms involving per is not recommended. The superior figures are usually not available on the keyboards of typesetting and linotype machines and composition is therefore delayed. There is also the likelihood of confusion with footnote reference numbers. These shorter forms are permissible in tables and are sometimes difficult to avoid in text.

Abbreviations

In this initial list of Abbreviations for Engineering and Scientific Terms only those most commonly used have been included.

Absolute	abs
Acre	a.
Acre-foot	a-ft
Air horsepower	air hp
Alternating-current (as adjective)	a-c
American wire gage (Brown and Sharpe)	Awg
Ampere	a or A*
Ampere-hour	ah or Ah*
Angstrom unit	A
Antilogarithm	antilog
Armature	arm.
Atomic weight	at. wt
Atmosphere	atm
Average	avg
Avoirdupois	avdp
Barometer	bar.
Barrel	bbl
Baumé	Bé

* Abbreviation recommended by the International Electrotechnical Commission.

Birmingham wire gage	Bwg
Board feet (feet board measure)	fbm
Boiler horsepower	boiler hp
Boiler pressure	bp
Boiling point	bp
Brake horsepower	bhp
Brake horsepower-hour	bhp-h
Brinell hardness number	Bhn
British thermal unit	Btu or Bt
Bushel	bu

Calory	cal
Candle	c
Candle-hour	c-h
Candlepower	cp
Center to center	c to c
Centigram	cg
Centiliter	cl
Centimeter	cm
Centimeter-gram-second	cgs
Cent	c or é
Chain	ch
Chemical	chem
Chemically pure	cp
Circular	cir
Circular mills	cir mils
Coefficient	coef
Cologarithm	colog
Concentrate	conc
Conductivity	cond
Constant	const
Continental horsepower	cont hp
Cord	cd
Cosecant	csc
Cosine	cos
Cost, insurance, and freight	cif
Cotangent	ctn
Coulomb	c or C*
Counter electromotive force	counter emf
Cubic	cu
Cubic Centimeter	cu cm, cm ³ , cc (liquid, meaning milli-liter)

Cubic foot	cu ft
Cubic feet per second	cfs
Cubic inch	cu in.
Cubic meter	cu m or m ³
Cubic micron	cu μ (cu μ) or μ^3
Cubic millimeter	cu mm or mm ³
Cubic yard	cu yd
Current density	spell out
Cycles per second	~
Cylinder	cyl

Day	spell out
Degree	deg
Degree Centigrade	C
Degree Fahrenheit	F
Degree Kelvin	K
Degree Réaumur	R
Diameter	diam
Direct-current (as adjective)	d-c
Dollar	\$
Dozen	doz
Dram	dr
Electric	elec
Electric horsepower	ehp
Electromotive force	emf
Elevation	el
Engine	eng
Engineer	engr

† Abbreviation recommended by the A.S.M.E. Main Committee on Power Test Codes.

* Abbreviation recommended by the International Electrotechnical Commission.

Engineering	engg	Liquid	liq
External	ext	Logarithm	log
Farad	f or F*	Logarithm (natural)	log _e or ln
Feet board measure (board feet)	fbm	Longitude	long.
Feet per minute	fpm	Low-pressure (as adjective)	l-p
Feet per second	fps	Lumen	l
Fluid	fl	Lumen-hour	l-h
Foot	ft	Lumens per watt	lpw
Foot-candle	ft-c	Magnetomotive force	mmf
Foot-Lambert	ft-L	Mark (German coinage)	M.
Foot-pound	ft-lb	Mass	spell out
Foot-pound-second	fps	Mathematics (ical)	math
Franc	fr	Maximum	max
Free aboard ship	spell out	Mean effective pressure	mep
Free alongside ship	spell out	Mean horizontal candlepower	mhcp
Free on board	f.o.b.	Megawatt	spell out or MW*
Freezing point	fp	Megohm	spell out or MΩ*
Frequency	freq	Melting point	mp
Furlong	fur.	Meter	m
Fusion point	fnp	Meter-kilogram	m-kg
Gallon	gal	Mho	spell out
Gallons per minute	gpm	Microampere	μa or μA* (mu a)
Gallons per second	gps	Microfarad	μf (mu f) or μF*
Generator	gen	Micromicron	μμ (mu mu)
Grain	spell out	Micron	μ(mu)
Gram	spell out	Microwatt	spell out or μw (mu w) or μW*
Gram-calory	g-cal	Mile	spell out
Greatest common divisor	gcd	Miles per hour	mph
Hectare	ha	Miles per hour per second	mphps
Henry	h or H*	Milliampere	ma or mA*
High-pressure (adjective)	h-p	Millifarad	mf or mF*
Hogshead	hhd	Milligram	mg
Horsepower	hp	Millihenry	mh or mH*
Horsepower-hour	hp-h	Millilambert	mL
Hour	h	Milliliter	ml
Hundred	C	Millimeter	mm
Hundredweight (112 lb)	cwt	Millimicron	mμ (mmu)
Hyperbolic sine	sinh	Million	spell out
Hyperbolic cosine	cosh	Million gallons per day	mgd
Hyperbolic tangent	tanh	Millivolt	mv or mV*
Inch	in.	Minimum	min
Inch-pound	in-lb	Minute	min
Inches per second	ips	Molecular weight	mol wt
Indicated horsepower	ihp	Mol	spell out
Indicated horsepower-hour	ihp-h	Month	spell out
Intermediate-pressure (adjective)	i-p	Motor-generator	m-g
Internal	int	National Electric Code	NEC
Joule	j or J*	Ohm	spell out or Ω*
Kilocycle	kc	Ohm-centimeter	ohm-cm
Kilogram	kg	Ounce	oz
Kilogram-meter	kg-m	Ounce-foot	oz-ft
Kilograms per cubic meter	kg per cu ³ m or kg/m ³	Ounce-inch	oz-in.
Kilograms per second	kgps	Parts per million	ppm
Kiloliter	kl	Peck	pk
Kilometer	km	Penny (Pence)	d
Kilometers per second	kmps	Pennyweight	dwt
Kilovolt	kv or kV*	Peso	spell out
Kilovolt-ampere	kva or kVA*	Pint	pt
Kilowatt	kw or kW*	Potential	pot.
Kilowatthour	kwh or kWh*	Potential difference	pd
Lambert	L	Pound	lb
Latitude	lat	Pound-foot	lb-ft
Least common multiple	lcm	Pound-inch	lb-in.
Lineal foot	lin ft	Pounds per brake horsepower hour	lb per bhp-h
Link	l	Pounds per square foot	lb per sq ft
Lira	spell out	Pounds per square inch	lb per sq in.
Liter	l	Pound sterling	£
		Power factor	pf
		Primary	pri

* Abbreviation recommended by the International Electrotechnical Commission.

* Abbreviation recommended by the International Electrotechnical Commission.

Quart	qt
Radian	spell out
Reactive kilovolt-ampere	rkva
Reactive volt-ampere	rva
Revolutions per minute	rpm
Revolutions per second	rps
Rod	spell out
Root mean square	rms
Round	rd
Secant	sec
Second	sec
Second-foot (cubic feet per second)	cfs
Shaft horsepower	shp
Shilling	s
Sine	sin
Specific gravity	sp gr
Specific heat	sp ht
Spherical candlepower	scp
Square centimeter	sq cm or cm ²
Square foot	sq ft
Square inch	sq in.
Square kilometer	sq km or km ²
Square meter	sq m or m ²
Square micron	sq μ (sq μ) or μ^2
Square millimeter	sq mm or mm ²
Square root of mean square	rms
Standard	std
Stere	s
Tangent	tan
Temperature	temp
Tensile strength	tens str
Thousand	M
Ton	spell out
Ton-mile	spell out
Twaddell	Twad
United States gage	USg
Versed sine	vers
Volt	v or V*
Volt-ampere	va or VA*
Volt-coulomb	vc or VC*
Watt	w or W*
Watthour	wh or Wh*
Watts per candle	wpc
Week	spell out
Weight	wt
Yard	yd
Year	yr

Reprints on Gaging Available

Reprints of an article by John Gaillard, mechanical engineer of the American Standards Association, entitled "Application of Tolerance System Depends upon Nature of Production Process," which appeared in *Automotive Industries* for April 26, 1930, are now available through the ASA Information Service. The article consists of a discussion of the relative merits of the unilateral and bilateral systems of tolerances.

* Abbreviation recommended by the International Electrotechnical Commission.

Definitions of Electrical Terms Being Standardized

The sectional committee on definitions of electrical terms, the personnel of which was approved at the meeting of the Standards Council held on June 12th, is now completely organized, fifteen sub-committees having been appointed.

The chairmen of these sub-committees form an executive committee which is holding regular monthly meetings.

The work is progressing rapidly, and it is expected that within a few months final reports of several sub-committees will be available for general criticism and suggestion. Preliminary reports of sub-committees number 3 and number 8, on transformers and transportation, respectively, have already been circulated to members of the sectional committee for criticism and comment.

When the work of the sectional committee is completed, there will be available to American industry a standard glossary of electrical terms which will be exceedingly useful in the preparation of specifications and contracts.

It is interesting to note that in the organization of this sectional committee the sponsor invited several of the larger companies publishing dictionaries to appoint representatives. In every instance, the publishers replied that they did not desire representation but would be happy to use the committee's report in compiling future editions of their dictionaries.

Dry Cell Specifications

A revision of the Specifications for Dry Cells and Batteries (C18-1928) has been approved by the sectional committee in charge of the project and submitted to the American Standards Association for approval. The revised specifications differ from the present standard principally in the performance requirements, these having in a number of instances been raised. In submitting the revised specifications, the Bureau of Standards, sponsor for the project, says:

"The specification is identical in all technical requirements with that which is being submitted to the Federal Specifications Board for approval as a master specification, but the form and arrangement of the two specifications differ decidedly. For the latter the arrangement has been made to conform to the present requirements of the Federal Specifications Board."

ASA Standards Council Approves Committee on National Electrical Code

Upon recommendation of the Electrical Advisory Committee, the personnel of the sectional committee having in charge the national electrical code was approved at the meeting of the Standards Council held on June 12th. This question had been the subject of long consideration on account of the fact that it has been the desire of the sponsors to reduce the personnel to a considerable extent, representation of several organizations formerly on the sectional committee having been discontinued. Among the latter organizations, the following, however, made strong representations due to their outstanding interest in favor of their inclusion in the personnel: The American Institute of Architects, the American Railway Association, and the Telephone Group (Bell Telephone System and United States Independent Telephone Association).

The Electrical Advisory Committee recommended the inclusion of these three groups and this action was sustained by the Standards Council. The request of the International Association of Industrial Accident Boards and Commissions was also considered and the Electrical Advisory Committee voted to appoint a small committee to look into the claims of this body and report back at a later date.

Plan for Interim Changes of Electrical Code

At the same meeting of the Electrical Advisory Committee, Mr. A. R. Small, chairman of the sectional committee on the National Electrical Code, reported action taken by his committee and approved by the sponsor relative to interim changes of the Code. A definite formal procedure had been adopted, the final step of which requires a letter ballot of the sectional committee membership.

The plan had had unanimous endorsement of those attending the annual meeting of the sectional committee and of the Convention of the National Fire Protection Association.

By means of such interim revision procedure, it will be possible to erase conflicts observed in recently published texts and to recognize new applications of ideas in the installation of wiring and apparatus without the delays necessarily involved in the formal biennial publication program.

Stress was put on the basic feature of the plan which was to have it available only for matters ascertained to be both desirable and non-controversial.

Drain Tile Revisions Considered by Committee

The ASA sectional committee on drain tile, under the sponsorship of the A.S.T.M., reports that during 1929 the following possible revisions of the American Standard Specifications for Drain Tile, A6-1925, were suggested:

1. Inclusion of a requirement for rate of applying load in making strength tests.

2. Revision of the strength test requirements to provide a closer correlation between required test strengths and loads for specified depths of ditch.

3. Inclusion of standards and tests covering durability in acid and alkali soils.

4. Revision of the requirements for the lower three-edge bearing when testing large tile, and the inclusion of the "Minnesota" bearing (lower sand-bearing and upper three-edge bearing).

"Informal discussion of these suggestions," according to the report, "brought out the facts . . . that there was no general demand for the revisions and that some of these suggestions probably would be considered also by Committee C-4 (of the A.S.T.M.) on Clay and Cement Concrete Pipe. Because of these facts it was considered best to defer action until several of them could be acted upon at one time, and in cooperation with Committee C-4 for questions affecting the standards of both committees.

"It was suggested that because of the increased use of perforated corrugated metal pipe for airport drainage, it might be within the province of the committee to consider specifications for such pipe. Since no demand for such specifications had been received from either consumers or producers, no action was taken."

Twist Drill Sizes and Drill Bushings

Technical Committees on Twist Drill Sizes and Drill Bushings (B5k and B5l), at a joint meeting held in Detroit in June, reported the results of the circularization of their proposal on the diameter and lengths of twist drills to industry. This proposal "C" covering a size range of .014 to .6875 ($11/16$) is the result of comments received on proposals "A" and "B" which were previously submitted to industry and reconsidered at the joint meeting of these two committees, December 3, 1929. Several minor changes were suggested at the meeting in Detroit with the recommendation that the proposal be held as tentative. This was deemed advisable in order that it might be submitted to several large user interests in an effort to further determine its feasibility before adoption.

Abrasive Wheels Code New American Standard

The revision of the "Safety Code for the Use, Care, and Protection of Abrasive Wheels" (B7-1926) was approved as American Standard on June 25, 1930. This code was developed under the joint sponsorship of the International Association of Industrial Accident Boards and Commissions and the Grinding Wheel Manufacturers Association of the United States and Canada. Dr. L. W. Chaney of the Bureau of Labor Statistics, Washington, D. C., served as chairman of the technical committee and A. Rousseau of the Norton Company, Worcester, Massachusetts, as secretary.

Probably the most important change presented by the revised code is that concerning the use of cast steel protection hoods. The Steel Founders' Society protested the prohibition against the use of cast steel which was contained in the 1926 edition of the code. A series of tests were performed with the result that cast steel hoods are now considered satisfactory for wheels with speeds up to 10,000 surface feet per minute. Other changes in the code, such as varying angles of exposure of the grinding wheel for different types of grinders, revision of the rules for handling and storing wheels, and revision of the requirements for flanges, were made as the result of the experience gained through the application of the provisions of the 1926 edition.

Fire Fighting Equipment in Mines

The proposed American Recommended Practice for Fire Fighting Equipment in Metal Mines (M17) has been submitted for ASA approval by the American Mining Congress and the National Fire Protection Association, joint sponsors for this project. The proposed standard was unanimously approved by the technical committee. Three of the twelve members of the committee in voting favorably did so with reservations. The standard will shortly be submitted with recommendations of the Mining Standardization Correlating Committee for action of Member-Bodies of the ASA.

Cast Iron Flanges and Fittings

Proposed standards for 25 pound cast iron (B16b2) and 800 pound cast iron (B16b1) pipe flanges and flanged fittings have been approved by the sectional committee and are now being considered by the sponsors preparatory to being submitted to ASA for final approval.

Approve Committee on Rotating Electrical Machinery

At the meeting of the Standards Council held on June 12th the personnel of the sectional committee on rotating electrical machinery was approved. This committee is a consolidation of four former sectional committees (C-23 Direct Current Rotating Machine, C-24 Alternators, Synchronous Motors, and Synchronous Machines in General, C-25 Induction Motors and Induction Machines in General, and C-26 Direct and Alternating Current, Fractional Horsepower Motors), and will standardize definitions, rating, and methods of test for these types of apparatus.

It is expected that, with the new set-up, progress on the standards for electrical rotating machinery will be rapid. The organization which has been arranged is such that cognate parts of the standards for the individual types of machinery will all be considered by a single committee of experts, thus insuring the complete correlation of all of the standards.

Refrigeration Safety Code Submitted for Approval

The safety code for mechanical refrigeration (B9) has been completed by the ASA technical committee and has been approved by the sponsor, the American Society of Refrigerating Engineers. The code covers the safe installation, operation, and inspection of refrigeration systems, and the storage of refrigerants. It applies to all refrigerating equipment employing fluids which are vaporized and liquefied or compressed in their refrigeration cycle. The code is now being put before the ASA Standards Council for consideration with respect to its approval as American Standard.

Aeronautical Symbols

A revision in the American Tentative Standard Aeronautical Symbols (Z10e-1929) has been approved by vote of the five sponsors and the ASA Standards Council. The sponsors are American Association for the Advancement of Science, American Institute of Electrical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers, and the Society for the Promotion of Engineering Education.

The revision consists of changing the symbol for propeller rate of rotation from "N" to "n." Copies of the standard may be purchased through the ASA office for thirty-five cents.

To Submit New Draft Test Code for Domestic Refrigerators

A final draft of the test code for domestic refrigerators has been prepared by a sub-committee of the ASA technical committee on the standardization of domestic refrigerators, and will shortly be submitted for approval. One of the important changes from previous drafts of the code involves having tests run with room temperature at 75 degrees F. instead of 80 degrees F.

In connection with the preparation of the test code, a questionnaire was recently submitted to the members of the technical committee. The returns show that a majority of those replying to the questionnaire favored the stating of refrigerator performance in terms of average conditions during twenty-four hours, starting with the full-rated charge of ice in the ice compartment, rather than in terms of those conditions existing at the moment when sixty per cent of the full ice charge remains in the ice compartment.

The majority of the replies to the questionnaire also favored a minimum test duration of four days instead of one week, and were in favor of placing the accuracy requirement of the test as high as practicable instead of having the accuracy of the method low enough to permit the use of equipment readily obtainable.

The members of the committee were about evenly divided on the question of permitting accidental positioning of ice, and also in deciding whether test conditions should be designated to simulate conditions now existing in service or to be representative of the best domestic practice. The members of the committee were almost unanimous in desiring the inclusion in the test report of a statement of that room temperature at which an average temperature of 50 degrees F. would be maintained in the food compartment of the refrigerator, a convenient form of stating the cooling efficiency of the box which had been suggested during discussions of the report.

A program for the future work of the sub-committees of the technical committee was decided upon by the executive group of this committee, meeting on July 3rd. In accordance with this program, sub-committee number one will undertake a study of the grading of refrigerators for quality; sub-committee number two will study dimensions and durability; sub-committee number three will prepare test codes for the performance of mechanical refrigerators, for mechanical strength of cabinet, and for

determining durability under high temperature and high humidity.

As part of its work, sub-committee number one will determine what information should be included on the name plate of the refrigerators. The committee is under the chairmanship of Mr. Charles H. Roe of Electrical Testing Laboratories, New York, and is under the sponsorship of the American Society of Refrigerating Engineers and the Bureau of Home Economics of the U. S. Department of Agriculture.

Industrial Sanitation Code

Several years ago the decision was made to undertake the development of a safety code for industrial sanitation and a technical committee was appointed. Many obstacles to the development of the code presented themselves, however, and the work was considerably delayed. Under the sponsorship of the United States Public Health Service, work on the subject is again going forward. The technical committee organization has been completely revised and a tentative draft of the code has been prepared for the consideration of the new committee.

Safety Code for Factory Lighting

A new edition of the Code for Lighting Factories, Mills, and Other Work Places (A11-1921) has been completed by the ASA technical committee on this subject and has been approved by the sponsor, the Illuminating Engineering Society. Many of the recommended values and the specifications for illumination for different classes of work have been changed. There has also been a general revision of the discussion of the advantages of good lighting and methods of securing it. The code is now being considered by the Standards Council of ASA for approval as American Standard.

Pressure and Vacuum Gages

The American Society of Mechanical Engineers has accepted sponsorship of the project of the standardization of pressure and vacuum gages.

According to a letter from the A.S.M.E., the preliminary organization of the committee will be begun immediately, with the intention of calling the first meeting early in the fall.

Standards Sought for Rod and Merchant Bar Coil Sizes in Rolling Mill Practice

At the request of the Morgan Construction Company and the Bethlehem Steel Company, the American Standards Association is investigating the desirability of developing nationally acceptable standards for inside and outside diameters of coils formed on reels, and sizes and weights of merchant bar bundles.

In suggesting this activity, it was pointed out that in designing wire mills some difficulty has been experienced in determining the size of coils required by customers and that it has usually been necessary for each mill to make a survey of each customer's previous requirements in order to determine the size of reels, removal pin plates, stripper plates, etc., to cover the range required. It was further stated that with the introduction of continuous rod mills, coils became standard at 300 pounds weight; however, with the introduction of continuous wire drawing equipment and the increased use of mechanical means by customers for handling this material, heavier bundles were demanded and quite recently mills for 400 pound and 450 pound bundles had been built and coils of 900 pound weight with outside diameters of 52 inches are contemplated. With the increased weight of the coil, an enlargement of its inner and outer diameters became necessary in order to keep the height of the coil down to practical limits where it would not tip over or get tangled during subsequent handling. Higher mill delivery speeds also call for a larger diameter of coils.

The ASA will welcome an expression of opinion from any company interested in the proposed standardization, including a statement in as much detail as possible of the inside and outside dimensions and weights of rod and merchant bar coil bundles with which the writer or his firm comes in contact.

Floor and Wall Openings Safety Code

The latest tentative draft of the Safety Code for Floor and Wall Openings, Railings, and Toeboards (A12) has been printed by ASA and can be obtained upon request to the ASA office. The technical committee and the National Safety Council, the sponsor organization, wish to secure constructive criticism of the code in order that when the final draft is prepared it may represent the best expression of available knowledge on the subject.

Unification of Building Exits Codes Sought

A joint meeting of the building exits safety code committee and the building code committee of the United States Department of Commerce was held at Atlantic City on June 27th for the purpose of obtaining a satisfactory basis for uniformity in the exit requirements of the two codes. Various editions of the national building exits code have been issued, the last in 1929. The building code committee of the Department of Commerce recently distributed for comment a draft of requirements which they are proposing to include in the Department's building code.

It seemed essential that the requirements of the two codes should be uniform, as otherwise much confusion would result and the cause of saving life from fire would suffer. The conference, after thoroughly discussing the points of difference in the codes and the desirability of uniformity, appointed a special joint committee which is charged with the duty of developing a revision of the two codes to bring them into complete harmony.

Radio Symbols Submitted

A report on graphical symbols used in radio communication (Z10g3) has been submitted to the American Standards Association for approval as an American Tentative Standard. Work on this standard has been in progress since April, 1926, in a sub-committee of the general ASA committee on scientific and engineering symbols and abbreviations. L. E. Whittemore of the American Telephone and Telegraph Company is chairman of the sub-committee.

The report is submitted to ASA only as a tentative standard, which will be used to crystallize opinion on the subject.

Any one who wishes to do so may obtain copies available for review through the ASA Information Service.

Work on Pipe and Tubing Standards

The Sectional Committee on Wrought Iron and Wrought Steel Pipe and Tubing (B-36) met in Detroit on June 10th, following a group of meetings of its sub-committees on plan and scope and on pipe and tubing for high and low temperature service. Progress was reported on the development of a basic formula for wall thickness for all sizes of pipe and on the preparation of specifications for various types of pipe for which no specifications were in existence.

Form Technical Committees on Mechanical Subjects

Organization meetings of technical committees on electric welding dies and electrode holders, milling machine tables, splined shafts and splines were held at the spring meeting of the American Society of Mechanical Engineers in Detroit, June 9th to 13th.

Mr. C. W. Spicer is chairman of the technical committee on splined shafts and splines. This committee will review the dimensions developed by the Society of Automotive Engineers and will further develop spline standards for use in other industries. The dimensions of the Society of Automotive Engineers are well accepted in other countries; therefore, the committee will give these dimensions serious consideration and make such additions as are necessary to fit in with the general line.

Mr. George A. Bouvier, of the Western Electric Company, was elected chairman of the technical committee on milling machine tables. The personnel of the committee was discussed and additions recommended. The scope of the committee is to be on the standardization of table lengths and widths of milling machines, including distances between slots to facilitate interchangeability of fixtures. This standardization is of especial value because of the economic gain as a result of the effect of standard lengths on floor space.

The chairman of the technical committee on electric welding dies and electrode holders is Mr. J. A. Weiger of Elkon, Inc., Detroit, Michigan. The scope of the committee is to be determined following the return of a questionnaire which is being sent by the committee to producers and consumers.

Purchase of Paper Towels

A prominent institutional purchasing agent has suggested that a comparative study should be made of all paper towels on the market in order to develop the various properties which would make possible the purchase of towels on specifications. One of our Sustaining-Members has recently made an inquiry in this same direction and offers the opinion that no specifications or test methods at present available are satisfactory for purposes of corporation purchasing of these goods. If any Sustaining-Members are interested in or have ideas to contribute regarding proper methods of selection or contracting for paper towel supplies, the information will be gladly received and made available to interested companies and purchasing agents of institutions.

Slotted Head Proportions

The American Standard for Slotted Head Proportions (B18c-1930), which was approved by ASA in April, has now been published by the American Society of Mechanical Engineers, and copies are available through the ASA Information Service at 45 cents per copy. The standard, which covers machine screws, cap screws, and wood screws, was prepared by a technical committee on bolt, nut, and rivet proportions under the sponsorship of the Society of Automotive Engineers and the American Society of Mechanical Engineers.

ASA Symbol

A resolution adopted by the Board of Directors of the American Standards Association on June 13, 1930, authorized formal adoption for use on printed matter, and copyrighting of the ASA symbol as it appears on the cover of the 1930 Year Book. In the Standards Council of the Association, which had made its recommendations to the Board in regard to the use of the symbol, it had been suggested that the extended use of the symbol for labeling of goods, imprinting on material made to ASA standards and specifications, etc., should be a matter for further consideration.

Standards for Mining Equipment

Copies of a fifty-page booklet containing drafts of Swedish standards relating to mining equipment have been received at the ASA office and may be borrowed for review by those interested. The drafts cover such subjects as: wheels for mining wagons, double side tipping wagons, rigid cars with round bottom and rigid cars with square section body, front dumping cars, and such miners' tools as hammer, pick, spade, hoe, pan, oilers, and sledge, and claw and bowes coupling. The drafts are in the Swedish language but the titles are given in English and the tables and drawings permit a review of the data without reference to the text.

Code for Low Pressure Boilers

A copy of the recently promulgated *Code for the Rating of Low Pressure Heating Boilers* issued by the Steel Heating Boiler Institute of Cleveland, Ohio, has been received at the ASA office, and Sustaining-Members may obtain copies either direct from the Steel Heating Boiler Institute, 1116 Guardian Building, Cleveland, Ohio, or through the ASA Information Service.